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"Western Treasure -- Deep, Wet Snow"

FEDERAL-STATE COOPERATIVE
SNOW SURVEYS AND IRRIGATION WATER FORECASTS

for

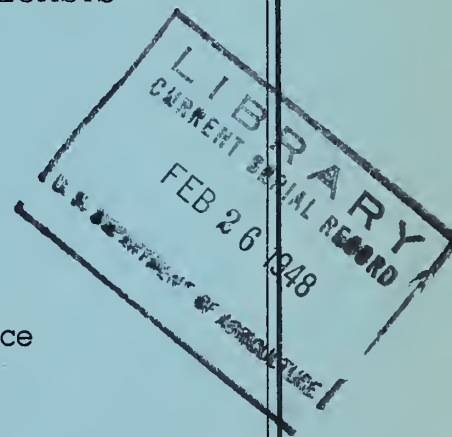
RIO GRANDE DRAINAGE BASIN

FEBRUARY 1, 1948

By

Division of Irrigation, Soil Conservation Service
United States Department of Agriculture
and

✓ Colorado Agricultural Experiment Station



Data included in this report were obtained by the agencies named above in cooperation with the U. S. Forest Service, National Park Service, State Engineers of Colorado and New Mexico and other Federal, State and local organizations.

February 1, 1948

WATER SUPPLY OUTLOOK.

RIO GRANDE AND CANADIAN
DRAINAGE BASINS

The prospective irrigation water supply for the Rio Grande Basin is generally below average. The headwaters of main stem of the Rio Grande and streams from the Sangre de Cristo range have an average snow cover. Deficiency in snow accumulation exists on the Chama, Conejos and Alamosa Rivers. This condition extends over northern New Mexico. Precipitation in the San Luis Valley has been above normal but a general dry condition is reported from New Mexico. Current snow cover at higher elevations on the Pecos and Canadian River watersheds is near average.

RIO GRANDE

The snow water content in the mountains to the west of the San Luis Valley as shown by recent snow surveys is generally below normal and less than a year ago. However, the valley is snow covered at this time. Courses on the main stem of the Rio Grande indicate an average snow accumulation. A definite deficiency exists on the headwaters of the Alamosa and Conejos rivers. Conditions are more favorable for streams originating in the Sangre de Cristo range on the north and east of the valley. The average snow water content on the Culebra course is 3.4 inches or 131 percent of normal. Soil moisture conditions are reported as good. Reservoir storage in San Luis Valley totals about 220 percent of last year.

On the headwaters of the Chama River and streams east of the Rio Grande in New Mexico the snow cover is considerably below normal. This deficiency extends as far south as Santa Fe. At Cumbres Pass the snow water content is 8.7 inches as compared to a normal of 12.7. Soil moisture conditions are poor. El Vado reservoir is nearly empty with only 5,964 acre-feet in storage. In the Albuquerque region local snow conditions are good due to recent storms. Stream flow is normal.

The combined storage in Elephant Butte and Caballo reservoirs is now 524,000 acre-feet as compared to 821,000 on February 1, 1947. Precipitation in the lower Rio Grande Valley in New Mexico is below normal. Soil moisture conditions are reported as fair.

The snow cover on the headwaters of the Pecos River is near normal and 70 percent above a year ago. Storage in Alamogordo, McMillan and Avalon reservoirs is now 32,000 acre feet and stream flow in the Carlsbad area is low. Precipitation in the lower valley is sub-normal. The soil is dry.

CANADIAN RIVER

On the tributaries to the Canadian River the snow accumulation is average and similar to last year at this time. Conchas Reservoir has in storage 347,970 acre-feet as compared to 370,573 on February 1, 1947. Soil moisture and crop conditions are reported as good at Tucumcari. Recent precipitation has been well above normal but there is no stream flow at this time.

SNOW SURVEYS AND IRRIGATION WATER FORECASTS
RIO GRANDE BASIN

STATUS OF RESERVOIR STORAGE, February 1, 1948

STREAM	RESERVOIR	USABLE CAPACITY 1000 A F.	THOUSANDS OF ACRE FEET IN STORAGE				
			About February 1,				
			1948	1947	1946	1945	10-year Ave. 1937-46
RIO GRANDE	Rio Grande	45.8	20.7	4.0	4.9	18.9	14.3
	Santa Maria	45.0	4.9	3.5	4.9	10.9	8.7
	Sanchez	103.2	8.7	5.9	6.1	9.5	15.8
	Terrace	17.7	5.6	2.6	1.4	3.2	3.0
	Continental	26.7	2.6	1.3	13.1	17.7	7.2
	Elephant Butte	2273.7	436.0	564.1	1099.6	1272.1	1167.4
CHAMA RIVER	Caballo	365.0	88.1	254.7	230.1	269.3	188.5
	El Vado	226.0	6.0	24.5	87.2	88.2	57.2
CANADIAN RIVER	Conchas	600.0	348.0	370.6	322.5	345.2	225.5
PECOS RIVER	Alamogordo	148.0	26.2	44.6	24.0	37.9	69.4
	McMillan-Avalon	45.0	6.2	12.4	7.2	8.5	18.6

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SNOW SURVEYS AND IRRIGATION WATER FORECASTS
for
RIO GRANDE BASIN
February 1, 1948

SUMMARY OF FEBRUARY 1 SNOW SURVEYS AND COMPARISON OF DATA WITH THAT OF
PREVIOUS YEARS BY WATERSHEDS

WATERSHEDS	Snow Depth			Water Content			Number Courses in Average	Snow Density			1948 Water Content in	
	Ten Year Avg.*	1947	1948	Ten Year Avg.*	1947	1948		Ten Year Avg.*	1947	1948	Ten Year Avg.*	percent of
In.	In.	In.	In.	In.	In.	Percent	Percent	Percent	1947	1948		
Rio Grande	23.8	23.3	23.4	5.7	5.9	5.1	22	24	25	22	90	87
Upper Rio Grande	30.1	32.1	33.5	7.1	8.2	7.8	3	23	25	23	110	95
Alamosa River	20.2	25.7	19.8	3.4	4.7	2.5	1	17	18	13	74	53
Concejos River	33.4	32.4	25.6	8.6	9.2	7.0	2	26	28	27	82	76
Culebra River	26.2	32.0	29.7	6.4	8.3	3.4	1	24	26	28	131	101
Chama River	30.3	30.0	22.7	8.0	7.9	4.8	5	26	26	21	60	61
Rio Taos	18.8	19.3	20.0	5.2	6.2	3.8	1	28	32	19	73	61
Embudo Creek	25.5	23.6	23.8	5.7	5.9	5.0	2	22	25	21	88	85
Pecos River	17.7	10.8	16.6	4.1	2.3	3.9	3	23	21	23	95	170
Canadian River	19.6	18.9	21.2	4.4	4.6	4.7	4	22	24	22	107	102

*Some for shorter periods

P R E C I P I T A T I O N D A T A

WATERSHED	STATE	Precipitation		Precipitation*		Departure from Normal Inches
		October 1 to January 31 Inches	Departure from Normal Inches	January Inches	Departure from Normal Inches	
Canadian	New Mexico					
Rio Grande	Colorado	4.26	+0.88	0.98	+0.18	
Rio Grande (N)	New Mexico					
Rio Grande (S)	New Mexico					
Pecos	New Mexico					

*January precipitation tentative

RIO GRANDE DRAINAGE SNOW SURVEYS
February 1, 1948

DRAINAGE BASIN and SNOW COURSE		LOCATION					SNOW COVER MEASUREMENTS					
		No. and State	Sec.	Twp. or Lat.	Range or Long.	Elev.	Date of Survey	Snow Depth (Inches)	Water Content (Inches)		Years of Record	Past Record Av. Water Content (Inches)
RIO GRANDE												
Wolf Creek Pass	26 Colo.	4	37N	2E	10000	1/30	52.0	14.0	16.1	5.8	9	14.3
Upper Rio Grande	27 "	13	40N	4W	9350	2/3	27.6	5.4	5.2	1.0	9	3.9
Silver Lakes	47 "	15	36N	5E	9600	1/30	19.8	2.5	4.7	2.6	9	3.4
River Springs	49 "	25	33N	6E	9300	2/2	18.5	5.2	6.5	2.4	8	4.5
LaVeta Pass #2	74 "	22	28S	70W	9300	1/30	37.4	7.0	7.0	3.3	9	4.9
Summitville	76 "	30	37N	4E	11500				14.0	4.8	10	
Cumbres Pass #2	77 "	17	32N	5E	10000	1/31	32.6	8.7	11.8	7.7	10	12.7
Santa Maria	80 "	8	41N	2W	9700	2/1	20.9	3.9	3.3	0.9	10	3.2
Culebra	82 "		37.2N	105.2W	10000	2/2	29.7	8.4	8.3	3.3	9	6.4
Fort Garland	84 "	13	29N	72W	8200	2/1	14.9	2.4	1.3	0.0	8	1.9
Red River	1 N. Mex.	29	28N	15E	9500	2/1	18.6	3.6	3.8	3.3	9	5.1
Taos Canyon	2 "	10	25N	15E	9000	1/30	20.0	3.8	6.2	3.1	10	5.2
Aspen Grove	4 "	12	18N	10E	9100	1/31	17.2	3.9	2.1	2.8	10	4.4
Lee Ranch	5 "	3	18N	4E	9050	1/31	22.4	4.4	4.3	1.8	10	5.1
Canjilon	6 "	4	26N	6E	9500	2/1	21.7	3.5	10.8	8.7	9	10.9
Hematite Park*	9 "	8	28N	15E	9500	1/30	22.1	5.4	4.1	1.7	8	3.7
Tres Ritos	12 "	23	22N	15E	9000	1/31	20.0	4.2	4.8	2.7	10	4.7
Pay Role	15 "	16	28N	7E	9700	1/31	24.3	4.4	7.8	2.2	8	6.2
Chama Divide	17 "		36.9N	106.7W	7750	2/1	11.5	2.7	2.8	1.9	9	4.1
Chamita	18 "		36.9N	106.7W	8500	2/1	23.7	4.5	6.5	3.3	7	5.9
Cordova	19 "	22	22N	13E	10100	2/1	27.5	5.8	7.0	4.9	7	6.7
Panchuela-#2	20 "	27	19N	12E	8300	1/31	16.6	3.6	1.8	1.5	10	3.3
Big Tesuque	21 "	17	18N	11E	10000	1/31	16.0	4.3	3.0	1.8	7	4.7
Elk Cabin	24 "	8	18N	11E	8250	2/1	15.5	4.1	---	---	1	---
Average for Drainage								5.1	5.9	3.0		5.7

*On adjacent drainage

RIO GRANDE DRAINAGE SNOW SURVEYS
February 1, 1948

DRAINAGE BASIN and SNOW COURSE	LOCATION				SNOW COVER MEASUREMENTS										
	No. and State	Sec.	Twp. or Lat.	Range or Long.	Elev. of Survey	Date of Survey	Snow Depth ' Inches	Water Content (Inches)			Years of Record	Past Record Av. Water Content (Inches)			
								1948	1947	1946					
RIO GRANDE TRIBUTARIES IN SAN LUIS VALLEY															
UPPER RIO GRANDE	26	Colo.	4	37N	2E	10000	1/30	52.0	14.0	16.1	5.8	9	14.3		
Wolf Creek Pass	27	"	13	40N	4W	9350	2/3	27.6	5.4	5.2	1.0	9	3.9		
Upper Rio Grande	80	"	8	41N	2E	9700	2/1	20.9	3.9	3.3	0.9	10	3.2		
Santa Maria					Average for Drainage				7.8	8.2	2.6		7.1		
ALAMOSA RIVER	47	Colo.	15	36N	5E	9600	1/30	19.8	2.5	4.7	2.6	9	3.4		
Silver Lakes	76	"	30	37N	4E	11500		19.8	2.5	14.0	4.8	10	3.4		
Summitville					Average for Drainage					4.7	2.6	9	3.4		
CONEJOS RIVER	49	Colo.	25	33N	6E	9300	2/2	18.5	5.2	6.5	2.4	8	4.5		
River Springs	77	"	17	32N	5E	10000	1/31	32.6	5.7	11.8	7.7	10	12.7		
Cumbres Pass* #2					Average for Drainage				7.0	9.2	5.0		8.6		
CULEBRA RIVER	82	Colo.		37.2N	105.2W	10000	2/2	29.7	8.4	8.3	3.3	9	6.4		
Culebra															
RIO GRANDE TRIBUTARIES IN NEW MEXICO															
CHAMA RIVER	77	Colo.	17	32N	5E	10000	1/31	32.6	8.7	11.8	7.7	10	12.7		
Cumbres Pass #2	6	N. Mex.	4	26N	6E	9500	2/1	21.7	3.5	10.8	8.7	9	10.9		
Canjilon	15	"	16	28N	7E	9700	1/31	24.3	4.4	7.8	2.2	8	6.2		
Pay Role	17	"		36.9N	106.7W	7750	2/1	11.5	2.7	2.8	1.9	9	4.1		
Chama Divide	18	"		36.9N	106.7W	8500	2/1	23.7	4.5	6.5	3.3	7	5.9		
Chamita					Average for Drainage				4.8	7.9	4.8		8.0		
*Cn adjacent drainage															

*Cn adjacent drainage

*On adjacent drainage

The following organizations cooperate in the snow surveys and irrigation water supply forecasts for the Colorado, Missouri-Arkansas and Rio Grande watersheds by furnishing funds or services.

STATE

Colorado State Engineer
Wyoming State Engineer
Utah State Engineer
New Mexico State Engineer
Montana State Engineer
Nebraska State Engineer
Colorado Experiment Station
Colorado Extension Service
Montana Experiment Station
Utah Experiment Station

FEDERAL

Department of Agriculture
Forest Service
Soil Conservation Service
Department of Interior
Bureau of Reclamation
Geological Survey
National Park Service
Department of Commerce
Weather Bureau
War Department
Army Engineer Corps

PUBLIC UTILITIES

Colorado Public Service Company
Western Colorado Power Company
Montana Power Company
Public Service Company of New Mexico
Denver and Rio Grande Western R. R. Comoany

MUNICIPALITIES

City of Bozeman
City of Denver
City of Boulder

WATER USERS ORGANIZATIONS

Poudre Valley Water Users' Association
Arkansas Valley Ditch Association
Colorado River Water Conservation District

IRRIGATION PROJECTS

Farmers Reservoir and Irrigation Company
San Luis Valley Irrigation District
Santa Maria Reservoir Company
Costilla Land Company
Uncompahgre Valley Water Users' Association
Wyoming Development Company
Goshen Irrigation District
Kendrick Project
Pathfinder Irrigation District
Salt River Valley Water Users' Association
San Carlos Irrigation and Drainage District
Twin Lakes Reservoir and Canal Company

Many other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.

